

DIFFERENCES IN TRANSVERSAL AREAS OF CALF MUSCLES IN ATHLETES

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In the investigations of muscle activity in different sports, their morphology is very important, but also difficult to measure precisely. Under specific sport training morphological and physiological changes in muscles occur. MRI and MRS offer excellent noninvasive tool for their evaluation (1,2). The aim of this study was to find differences among various groups of sportsmen by MRI and to evaluate them in terms of specific sport technique. T₁ weighted images (TR = 600 msec, TE = 34 msec) of calf were performed on 2.35 T MR imager with the time for entire measurement of 8 minutes. Thirteen well trained athletes from different sports were chosen to characterize different types of muscular activity (sprint, distance run, and free climbing). A group of nonactive persons was measured as a control. Differences among transversal areas of muscles of the calf were assessed between the first and the second quarter proximally. Results are shown in Fig. 1. It was found that besides differences in transversal areas of muscles there are also differences in their shapes and in their relative positions, but they were not possible to be quantified. It can be seen from histograms that differences between sport active and sport non-active persons as well as among different sports occur. Due to small sample number, in most cases differences among groups are not statistically significant. Although statistics show insufficient differences some of them can be well interpreted in terms of sport technique specialization. For

example, m. gastrocnemius medialis seems to be a prime mover in both running events, while in free climbing this is m. soleus (Fig1).

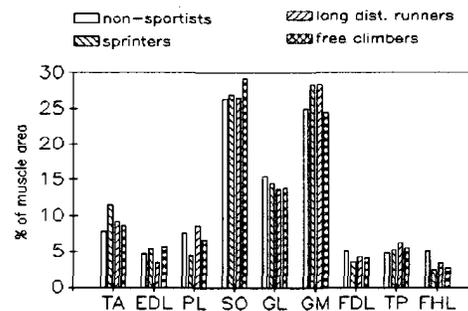


Fig.1: Relative transversal areas of the calf muscles.

Abbr.:TA (tib.ant.), EDL (ex.digit.l.), PL (peron.l.), SO (sol.), GL (gastr.l.), GM (gastr.m.), FDL (fl.digit.l.), TP (tib.pos.), FHL(fl.hall.l.)

References:

1. Park J.H., Brown R.L., Park C.R., Cohn M., and Chance B, Proc.Natl.Acad.Sci., 84,8786-8784,1988
2. M.J Fisher, G.R. Adams, J.M. Foley and R.A. Meyer, 8th Soc. of Magn. Reson. in Medicine Meeting, Amsteram 1988, abst no 312